

ACTS Advanced System Concepts and Experimentation

Mr. Brian S. Abbe
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, MS 238-420
Pasadena, CA 91109, USA
Phone: 818354-3887
Fax: 818354-6825

Mr. Noulie Theofylaktos
NASA/Lewis Research Center
21000 Brookpark Rd., MS 54-6
Cleveland, OH 44135, USA
Phone: 216433-2702
Fax: 216433-6371

Abstract (full paper will be provided at the Conference)

Over the course of the first two years of experimentation with the Advanced Communications Technology Satellite (ACTS), many different K/Ka-band applications-oriented experiments will be conducted and evaluated for their commercial viability. In addition, the technological developments and advanced systems concepts associated with the various terminals and the satellite itself will also be examined. Beyond these existing experiments and "the current terminal developments, many other new and exciting experiment ideas and advanced system concepts exist. With the additional use of ACTS for the last two years of its lifetime, many of these ideas could be explored.

In the mobile satellite communications arena, a particular applications-oriented concept that has yet to be developed is a maritime-mobile experiment. Applications of K/Ka-band mobile satcom technologies to the pleasure cruise industry could provide similar communications services as those that are being developed for the broadband aeronautical experiments. A second applications-oriented experiment that could be of interest is the development of a hybrid satellite-cellular system experiment. In such an experimental system, a mobile K/Ka-band satellite service would extend the coverage of the already existing cellular network.

Many new system concepts and terminal developments could also be accomplished. The initial characterization of the K/Ka-band mobile satellite communications propagation channel and evaluation of the currently existing rain compensation algorithms (RCAs) could lead to a second generation RCA development that would improve the overall ACTS Mobile Terminal (AMT) performance. In addition, the development of an enhanced modem to be used with the AMT that utilizes CDMA spread spectrum would also improve the overall terminal efficiency and provide a greater commercial potential for K/Ka-band applications. Other techniques worthy of further exploration and evaluation include the development of new Doppler estimation algorithms and demodulation techniques such as pseudo-coherent demodulation. The possibility of exploring these new and exciting experiment and conceptual ideas, as well as many others, with an extended ACTS satellite lifetime, will be examined in this paper.